

* Vitamins

can

store in our body

→ fat-soluble - A, D, E and K, B₁₂
(or) (water-insoluble)

↓

contain ch

→ Water-soluble - B group and vit C
(except B₁₂)

→ micro-material which is required in our body in small amount

→ our body doesn't produce vit.

- vit A (Retinol) → Night blindness
- vit B₁ (Thiamine) → Beri-Beri
- vit B₂ (Riboflavin) → Cheilosis, digestive disorder
- vit B₆ (Pyridoxin) → Convulsion
- B₁₂ (Cyanocobalamin) → Pernicious anaemia
- C (Ascorbic acid) → Scurvy (bleeding gums)
- D (Calciferol) → Rickets
- vit E (Tocopherol) → Muscular weakness
- K (Phytonadione) → Increase blood clotting time

• Iodine → Goiter

• Calcium → Bones & teeth decay

• Iron → Anaemia

• Magnesium is an important component of chlorophyll.

* Carbohydrate ($C_x(H_2O)_y$)

- Compound of $C + H_2O$
- Function groups: $-OH$ (hydroxy group) (always), Ketone (CO), aldehyde ($-CHO$)
- optically active (chiral carbon present)
 - ↳ C attached with diff. groups.
 - ↳ can rotate ppl.

• Types

① Monosaccharide

- can't hydrolysis further.
- C_x : Glucose (~~Ketohexose~~), Fructose (~~Ketohexose~~)
 - ↳ (aldohexose)
 - ↓
 - Sweetest sugar

② Disaccharide (Oligosaccharide)

- give 2 to 4 unit of monosaccharide after hydrolysis.
- eg. Sucrose (give 1 unit G & 1 unit F)
 - Maltose, Dextrose, Lactose (in milk)
 - ↓
 - Sweetness $S \downarrow$, $M \uparrow$ $G + galactose$

starch ÷ in plant

glycogen ÷ store in our body



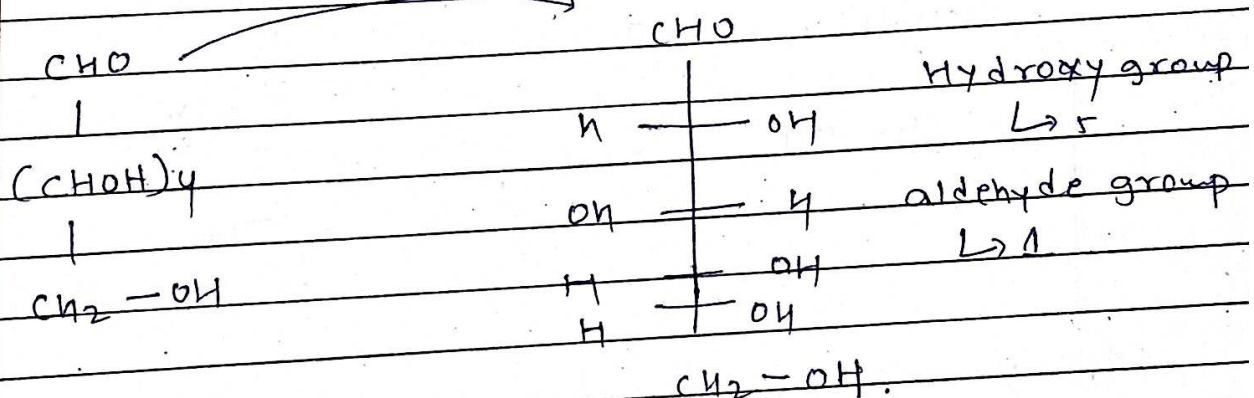
② Polysaccharide

- give more than 10 units of monosaccharide
- ex - cellulose, starch (give only 6 unit), glycogen

• Glucose ($C_6H_{12}O_6$)

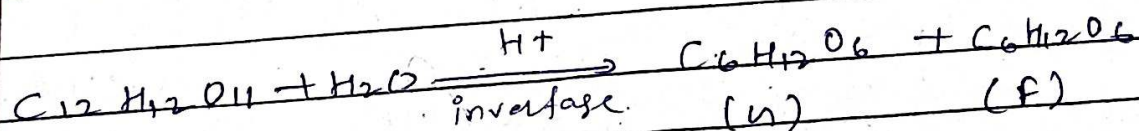
- 2 functional group
 - Hydroxy ($-OH$)
 - aldehyde ($-CHO$)

Fisher projection

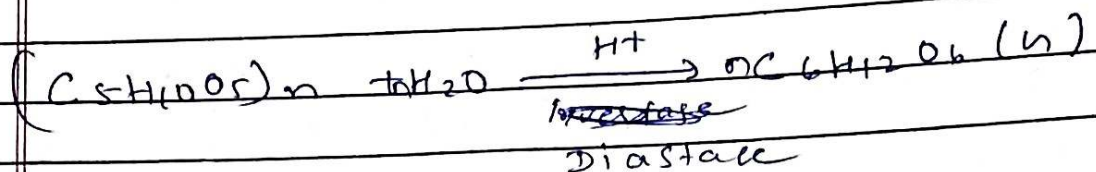


• preparation of glucose

(i) from sucrose



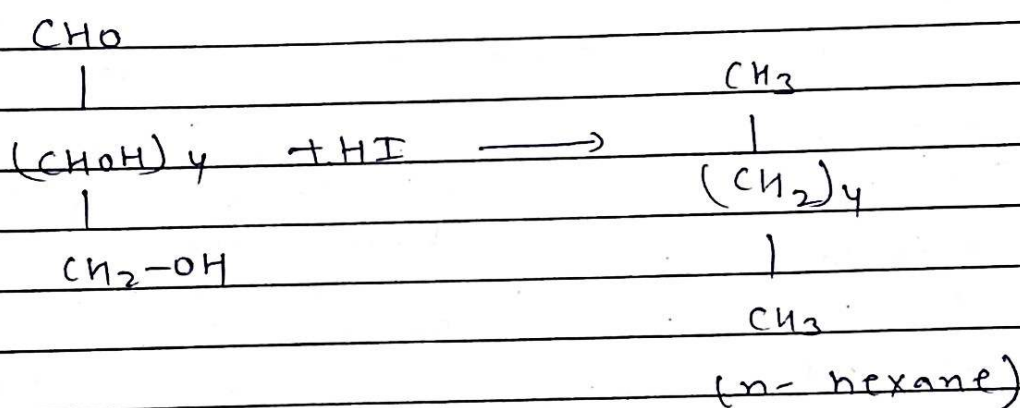
(ii) From starch



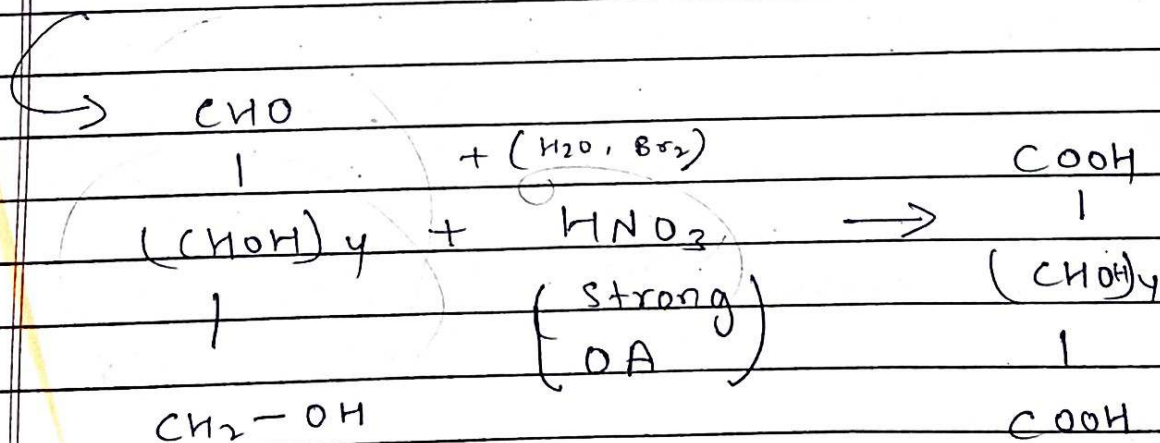
• Chemical reaction of glucose:-

(i) prove glucose's carbons is connected in straight line.

→ glucose reaction with HI (strong RA) or (red phosphorus) -



(ii) prove glucose has aldehyde hydroxy group



gluconic acid

Sugar & Non-sugar.

• Sugar ÷ sweet test ÷ Disaccharide & monosaccharide

• Non-sugar ÷ not sweet in test ÷ polysaccharide

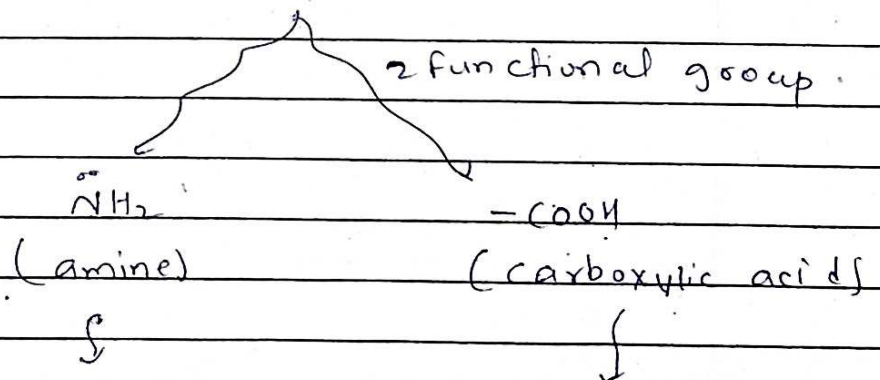
• Reduce sugar

↳ reduce fehling's solution & Tollen's reagent
e.g. all monosaccharides, lactose, maltose.

• Non-reducing sugar

↳ ex: sucrose

* Protein (monomer ÷ Amino acid) (Amphoteric)

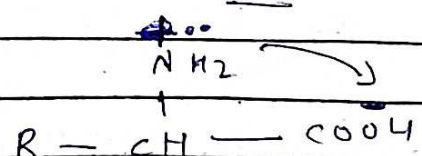


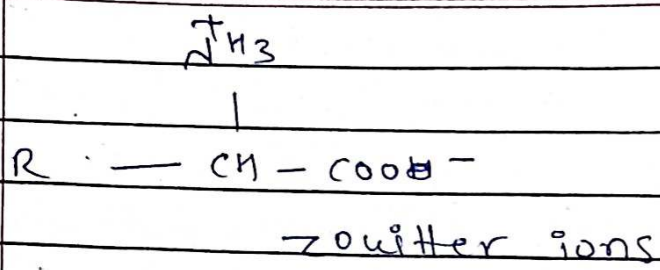
Base

acidic

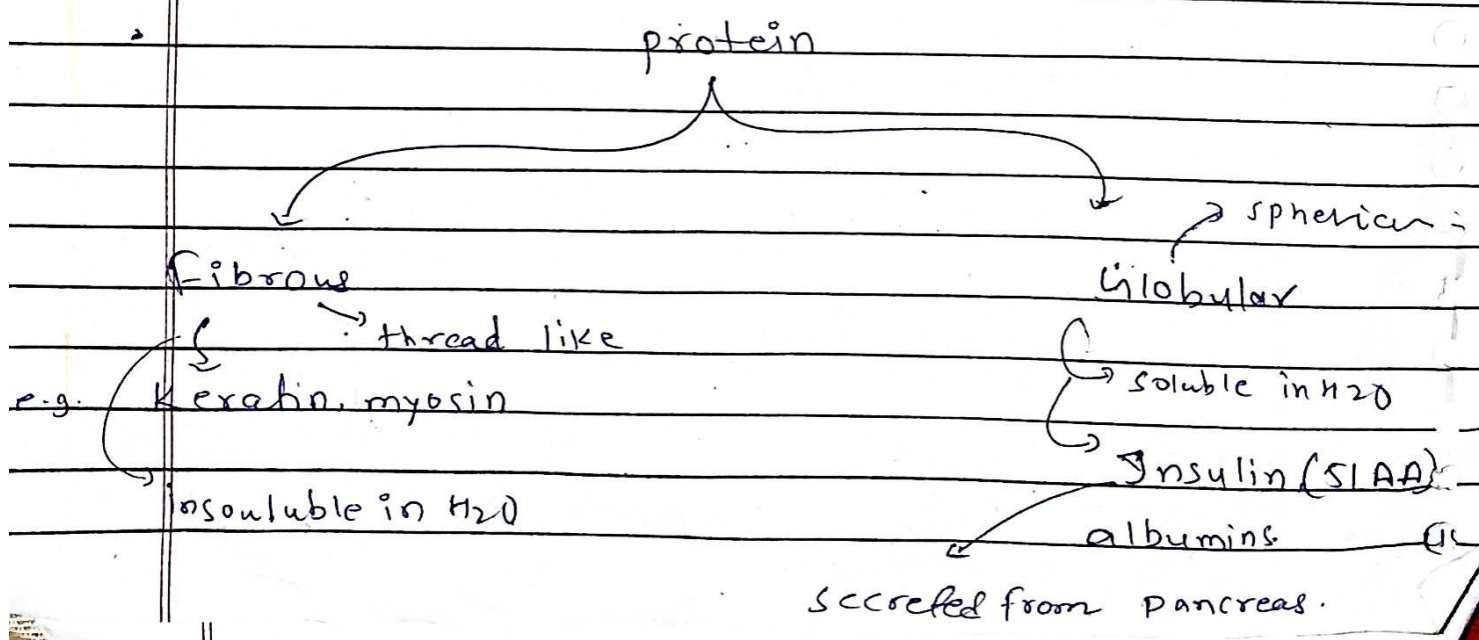
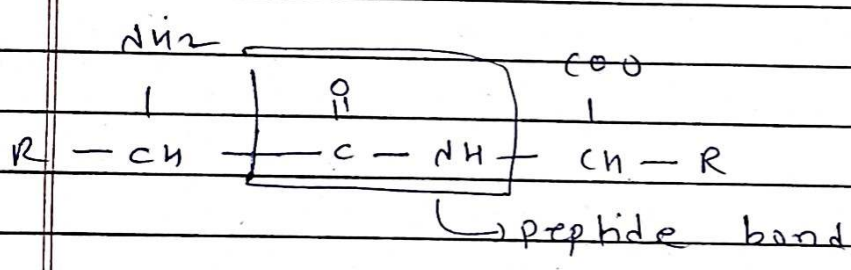
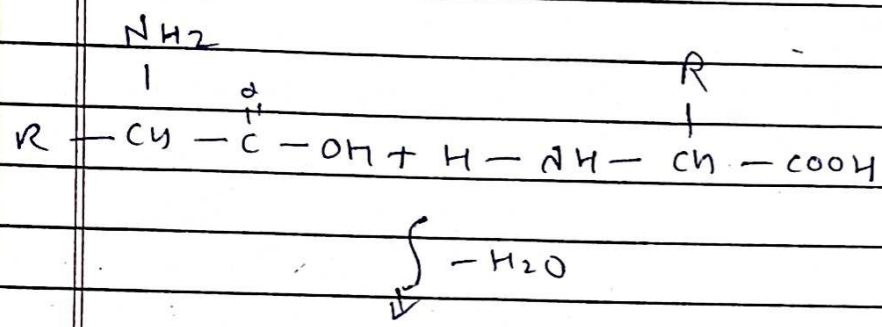
Amino acid

↳ representation





Two amino acid connected with peptide bond ($-\text{C}(=\text{O})-\text{NH}-$) ($-\text{CO}-\text{NH}-$)



Amino acid

Essential

Non-essential



not synthesis

synthesis by body

by body.

• Denaturation of protein.

↳ Breaking of structure of protein by change in tem. and pH value is called Denaturation of protein.

• protein in haemoglobin + Fibrinogen + globulin

↓
help in
clotting of
blood.

✗ Enzymes

↳ proteins (mostly globular protein) ~~are~~ which are very specific for a particular reaction.

* Nucleic acid

- $B + S \rightarrow$ glycosidic bond
- nucleoside + p $\rightarrow$ phosphoester bond
- Nucleotide + Nucleotide $\rightarrow$ phosphodiester bond.

Artificial

* Sweeping agent

- $\rightarrow$
 - $\hookrightarrow$ sugar which don't provide energy
 - $\hookrightarrow$ It is not carbohydrate.
 - $\hookrightarrow$ ex: Saccharin, Aspartame, Alitame.

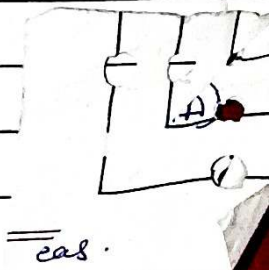
• $-CONH_2$

$\hookrightarrow$ Amido group.

• Insulin obtain from pancreas.

• Helical structure of protein is stabilize by Hydrogen bond.

• Nature amino acid $\div$ Glycine



polymer

- Bio-degradable polymer.
↳ PHBV

- ~~Dacron~~ / Teflon / ~~Polyester~~

↳ ~~condensation of dimethyl terephthalate~~
tetrafluoro ethene
ex: $F_2C=CF_2$ (monomer)
(addition)

- Dacron

↳ Condensation of ethylene glycol & terephthalic acid

- polyester

↳ ex: Terylene
monomer unit join by $(-COO-)$ ester linkage.

- Bakelite

↳ thermosetting plastic
↳ by phenol & formaldehyde

- Artificial rubber

↳ (addition)
Buna-N, Buna-S

- Neoprene

- NBDP → polyethene

- Natural rubber

↳ monomer: Isoprene

- Nylon-6,6 / polyamide

↳ condensation of vinyl chloride
adipic acid (monomer)

- Thermosetting plastic polymer

↳ Bakelite, Terylene
↳ condensation polymer

- ~~Thermoplastic~~

Thermoplastic polymer

↳ polythene, PVC, Teflon.
↳ addition polymer

- nylon

↳ ~~monomer~~ adipic acid

- PVC

↳ monomer: Vinyl Chloride

Chemistry in Everyday

Ajanta

Page No.

Date

- Anti-pyretics

↳ Aspirin, paracetamol.

- Analgesics - morphine, codein, heroin (del from opium), aspirin & analgin

- Tranquillizer

↳ reserpine (an alkaloid)

- Anti-malarials

↳ chloroquine

- Anti-septic

↳ Dettol, 0.2% phenol.

- Antibiotic for typhoid

↳ chloramphenicol

- Antacid

↳ magnesium hydroxide

- Disinfectant

↳ chloramine-T

- Tuberculosis

↳ drug: Hydrazine

- Dettol

↳ chloroxylenol + sephenol

- Antibody

↳ penicillin Ampicillin,

- food preservative

↳ SO_2 , sodium benzoate.

- Artificial sweetener.

↳ Saccharine, Aspartame, Sodium cyclamate

- Sodium Stearate

($C_{17}H_{35}COONa$)

- Anti-oxidant

↳ Lecithin, citric acid, vite.

- Soap

↳ Alkali salt of palmitic acid.

- Soap

↳

form micelles

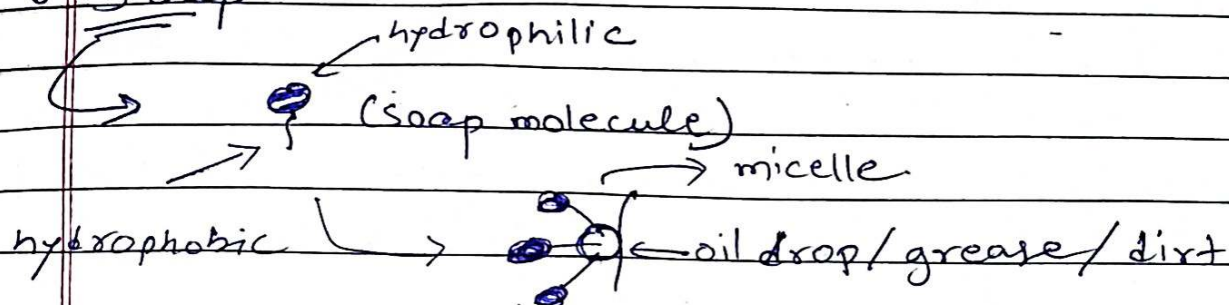
such a way that hydrophilic part of oil particle like bristles which

micelle



oil drop

• Soap



because hydrophilic is water loving and hydrophobic is grease loving, then grease will remove with water current

Amine

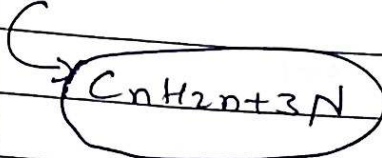
less basic than ammonia
due to involvement of
one pair in resonance

• Aniline

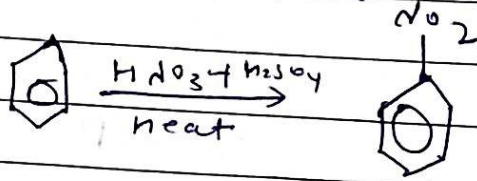
→ one H of ammonia
replace by benzene ring
→ It is basic

• Aniline react w/ Acetadeh.
- de to form Schiff's base

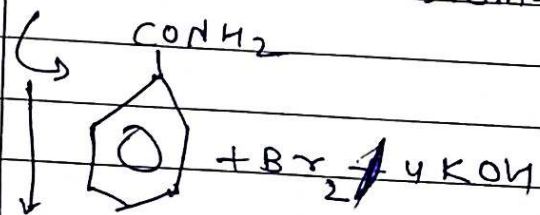
• Amine



• Nitration of benzene

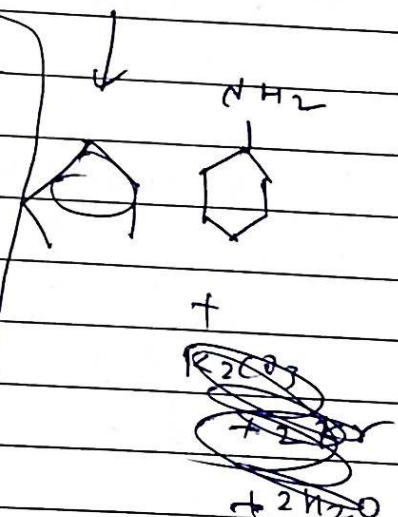


• Hoffmann's bromamide rxn



Acetamide
+ Br_2 / KOH

↓
methyla-
mine

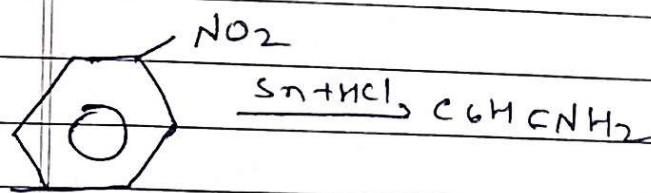
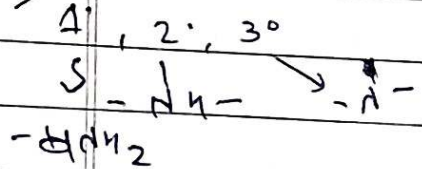


benzene diazonium
chloride

(It can be tested by Carbyla-
mine test, azo-dye test)

• Amine more basic than ammonia

→ H group of ammonia
replaced by alkyl group



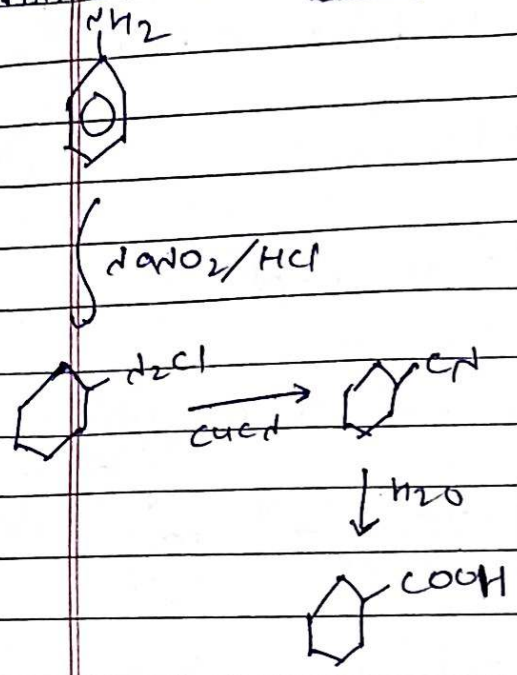
• C6H5N2+ Cl- $\xrightarrow{H_3O+}$ phenol + $N_2(g)$
(benzene diazonium chloride)

• p-Nitrophenol is more
acidic than p-methyl
phenol because it has NO_2
w-group, which is e-
withdrawing group.

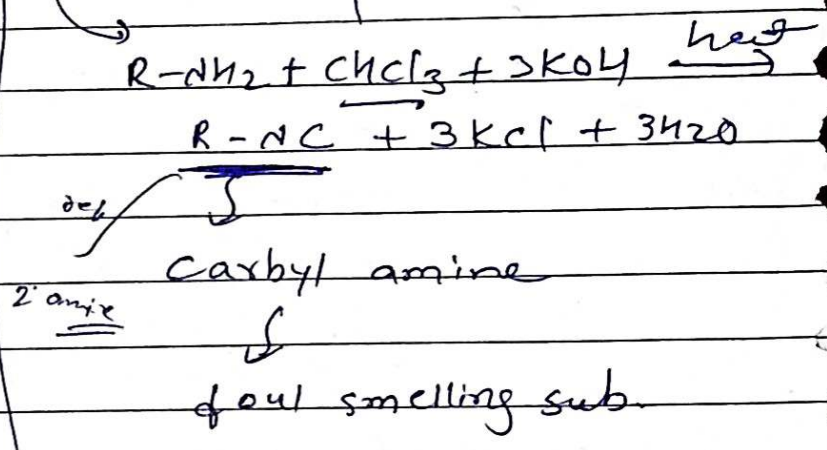
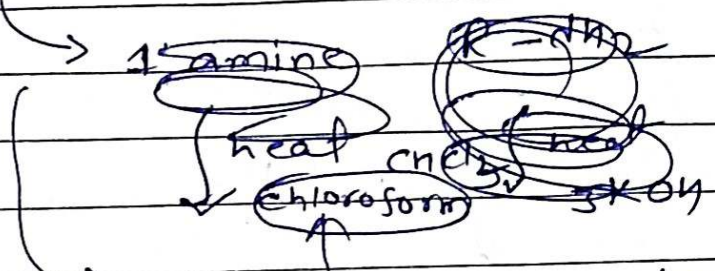
• Anilide $\xrightarrow[\text{lysis}]{hydro}$ $R-NH_2$
1° amine

COOH

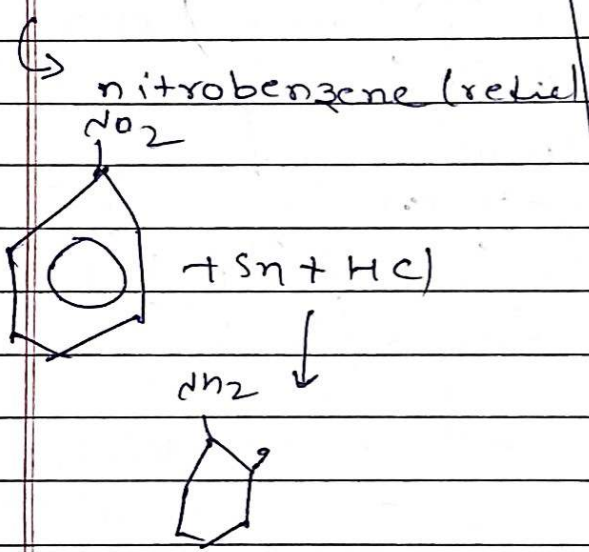
• Aniline to Benzonic acid



• Carbyl amine reagent.
Used to test 1^o amine (presence).



• Aniline

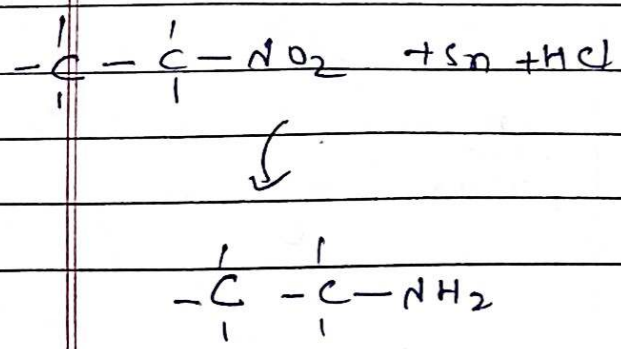


• Aniline dissolves in HCl because aniline is basic.

• Amines are stronger bases than NH_3 because of the +I effect due to alkyl group.

• ethylamine

↳ reduction of nitro ethane



• 1^o amine with azine reagent (R-NH₂)

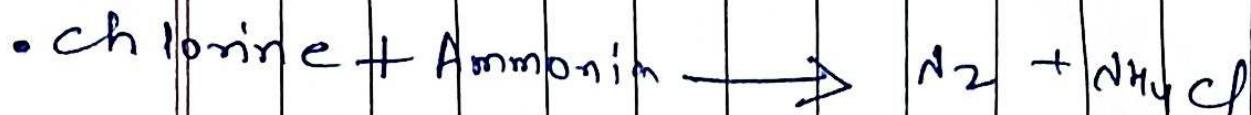
↓ give
An alkane

BIO① ~~2~~

- crossing over - Pachytene
- Stagen
- ~~trans~~ genetic material of bacteriophage - DNA
- t-RNA
 - ↳ clover leaf structure
 - ↳ Souble
 - ↳ Anticodons present
- operon model
 - ↳ Jacob and Monod
 - ↳ gene regulation

② ~~2~~

- Echidna is connecting link, dodo is extinct species
- cancer caused by oncogenes
- ~~disease~~
- Rarikhel disease found in Hen,
- In silk thread fibroin protein is found.
- cyanobacteria is useful as biofertilizer in rice field
- GAATTC is recognition site of EcoRI
- World Environment day
 - ↳ 5th June



• White & yellow phosphorus are Allotropes

Phosphoric acid

acid $\rightarrow$ red litmus paper

• Nitric acid prepared by contact process
(HNO_3)

• PCl_5 is an oxidising agent

Blue

• NH_3 give yellow or brown precipitate with alkaline Nessler's reagent.

• most stable oxidation state of bismuth: $+3$

• $NaNO_3$ gives colorless gas on thermal decomposition

• Carbon atom in carbonyl group (sp^2)

• max ionisation potential $\rightarrow$ p
(NO_2 - color)

Carbon has max catenation property

• finely divided iron can be used in manufacture of NH_3

• Mercuric chloride reacts with NH_3 and give ~~precipitate~~ precipitate

AlF_3 is least basic

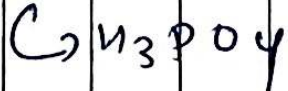
Haber's process



NH_3 can be dried by $\rightarrow CaO$

H_3PO_4 is tribasic

Orthophosphoric acid



- Mass action $\div$ ROR & active mass of R.
- Heat of neutralisation $\div$ 1gm acid + 1gm alkali mixed in a dilute soln. the evolve is heat of neutralisation.

• Ionic character
 $\rightarrow$ depends on covalent character due to cation.

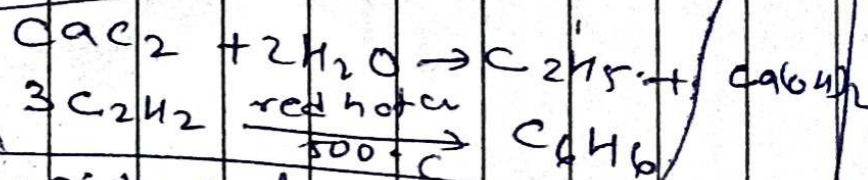
• Calcium carbide is treated with water $\rightarrow$ Acetylene (passed through red-hot Cu tube)
 $\downarrow$
 Benzene.

• Alkyne $\div$ sp

Alkane - sp³

$\rightarrow$ sp-character

~~increase acid~~
 acidic character increases in Alkyne is more acidic



• Bidentate ligands.

$\rightarrow$ ex: Ethylene diamine or oxalatoion.